CIRCUIT DESCRIPTION

CD-1A277-01
ISSUE 2AC
APPENDIX 3D
DWG ISSUE 8D
DISTN CODE 1T99

ELECTRONIC SWITCHING SYSTEMS
COMMON
DIAL TONE DELAY ALARM
CIRCUIT

CHANGES

D. Description of Changes

D.1 Corrected connecting information as required for installation in No. 3 ESS.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 7214-GJS-JH

ELECTRONIC SWITCHING SYSTEMS
COMMON
DIAL TONE DELAY ALARM
CIRCUIT

CHANGES

D. Description of Changes

D.1 Made the following changes so that the circuit can be installed in No. 2, No. 2B, and No. 3 ESS.

(a) Added the required connecting information to the Lead Index and FS-1.

(b) Added options V and W to the circuit.

(c) Added CAD 8 to show the terminal strip added for option V.

F. Changes in Description of Operation

F.1 Change Section III, 3.12, to read:

3.12 Provides a locking pushbutton switch (TST) which will open.....

F.2 Add to Section III, 4.01, the following connecting circuits:

(i) 15A Grid Circuit - SD-3H120-01.

(j) Master Scanner Applique Circuit - SD-1A210-01.

(k) No. 3 ESS P.D. Applique Circuit - SD-3H911-01.

(l) Maintenance Frame Circuit - SD-1C912-01.

(m) Remreed Switching Network Circuit - SD-2H211-01.

(n) Line and/or Trunk Switching Circuit - SD-2H163-01.

(o) Master Scanner Applique Circuit - SD-1A133-01.

(p) Trunk Peripheral Decorder Applique Circuit - SD-2H117-01.

(q) Maintenance Center - SD-2H009-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5362-GJS-GH

ELECTRONIC SWITCHING SYSTEMS

NO. 1 OR NO. 1A ARRANGED WITH 2-WIRE FEATURES AND, NO. 1 ARRANGED WITH 4-WIRE FEATURES

DIAL TONE DELAY ALARM CIRCUIT

CHANGES

D. Description of Changes

D.1 Corrected App Fig. 1 and CAD 1 so that the drawings agree with the manufactured product.

D.2 Removed a terminal strip previously added for option X from the circuit.

D.3 Changed the designations of the leads to the master control center.

D.4 Expanded FS 1 to show additional connecting information required for No. 1A ESS.

D.5 Added CAD 6.

D.6 Added Equipment Note 207.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5317-GJS-GH

ELECTRONIC SWITCHING SYSTEMS

NO. 1 OR NO. 1A
ARRANGED WITH 2-WIRE FEATURES AND
NO. 1 ARRANGED WITH 4-WIRE FEATURES

DIAL TONE DELAY ALARM CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The dial tone delay alarm (DTDA) circuit is assigned a line terminal location with an originating-only class of service. The DTDA is completely autonomous and has the capability of originating a call at intervals of time adjustable between limits of 20 and 60 seconds. The circuit, upon going off-hook, checks for the presence of 2 seconds of dial tone. If dial tone is recognized within 9 ± 1 seconds, the test line is released. No dial tone or delayed dial tone in excess of 9 ± 1 seconds results in failure. The circuit, having recognized the presence of dial tone, also checks that dial tone is disconnected upon cycling to the on-hook state. If dial tone is still present after a 9 ± 1 second interval, a failure indication is given.

1.02 When a failure condition exists, the test circuit is arranged to sound an alarm. Two alarm features are provided by the DTDA. The circuit has a self-contained alarm comprised of a 1000-Hz tone that is sounded if a failure is encountered. The circuit alarm is interfaced with the office's regular alarm system. If a failure is encountered, a major alarm is sounded. The major alarm sounded by the external alarm circuit can be retired at the master control center. The internal alarm, which is also activated, may be retired at the DTDA by operation of the reset (RST) key or under system control via the signal distributor applique circuit. Retirement of the internal alarm will cause the test sequence to be recycled by the DTDA circuit. The circuit also provides the means by which the system may inhibit the alarms via the signal distributor applique circuit.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The DTDA circuit connects to a single test line having an originating class of service (denied-terminating). Since only one line is used to test for dial tone, a trouble peculiar to the test line could activate the alarm. The extent of the trouble causing the alarm should be determined before remedial actions are taken.

2.02 The line location to which the test line is assigned should be changed at intervals of 2 months. The new assignment may be in any frame, but it should not be associated with the same first stage as the previous assignment. Rotation of the test line assignment will distribute the test-call load more equitably.

2.03 The DTDA circuit tests for the presence of dial tone by initialing an

off-hook condition on the test line. This off-hook condition is detected as an origination by the system. The system attempts to connect the test line to a customer dial pulse receiver. If dial tone is returned within 9 ± 1 seconds, the DTDA circuit will check that the dial tone is continuously present for 2 seconds. Upon successful detection of dial tone, the DTDA circuit will restore the test line to an on-hook condition. If dial tone is removed from the test line within 9 ± 1 seconds, the test is successful and the test sequence is recycled.

2.04 The DTDA sounds an alarm when dial tone is not detected within 9 ± 1 seconds after the test line goes off-hook or dial tone is not present for at least 2 seconds. If 2 seconds of dial tone is detected after the alarm is sounded, the alarm is automatically retired and the circuit recycles.

2.05 The circuit will time for 9 ± 1 seconds for the test line to release from dial tone. If dial tone is still present at the end of the 9 ± 1 second release interval, an alarm will sound. If dial tone is released after the alarm is sounded, the alarm is automatically retired and the circuit is recycled.

SECTION II - DETAILED DESCRIPTION

1. DIAL TONE SIGNAL

1.01 Dial tone, as used in ESS offices, is composed of 2 frequencies in the speech band. A valid dial tone signal consists of 350 and 440 Hz at a level of -10 dBm ± 3 dBm when tip and ring are terminated in 900 ohms.

1.02 The DTDA is designed to differentiate between valid dial tone signals and noise without responding to special out-of-band signals.

2. PURPOSE OF CIRCUIT COMPONENTS

2.01 The DTDA is made up of three printed wire boards and associated components which include three timing circuits. The purpose of each device will be described in the order in which the timing circuits are utilized.

2.02 The dial tone alarm timer (CP A802) has the capability of originating a call at intervals of time adjustable between limits of 20 and 60 seconds. This adjustment is controlled by the setting of the TIME potentiometer. At the end of the origination timing interval (timing interval 1), the timer output signal activates the OR relay driver on CP A803. Operation of the OR relay performs three functions:

(a) Resets the dial tone alarm timer CP A802

(b) Changes the logic function of CP A802 to perform the 9 ± 1 second timing interval (timing interval 3)

(c) Closes the loop through repeat coil RC1 and, if option Z is used, causes closure of contacts E and EG, thus creating an off-hook condition.

2.03 The off-hook condition is detected as an origination by the system. The system attempts to connect the test line to a customer dial pulse receiver. If present, dial tone enters T and R of the DTDA circuit and is connected to the dial tone detector (CP A801) through repeat coil RC1. The detector amplifies the signal and applies it to the filter and the monitor. The filter consists of a twin-T network and logic circuit used for recognition of dial tone frequencies. To provide added protection against dial tone simulation, the detector does not deliver a signal-present output until the signal is present for approximately 2 seconds (timing interval 2). If the validity check fails after the 2-second timing interval has begun, the detector timer is recycled and must start over again.

2.04 If a valid signal persists for the required period, the detector timer delivers a signal to the DT relay driver on CP A803. Operation of the DT relay resets the dial tone alarm timer (CP A802) and starts timing interval 3 (9 ± 1 seconds) again to check for the release of dial tone. When dial tone is released, the circuit is recycled to start a new origination.

2.05 No dial tone or delayed dial tone in excess of 9 ± 1 seconds results in operation of the TO relay by the dial tone alarm timer and relay driver on CP A802 and A803, respectively. Operation of the TO relay connects the square wave generator (CP A802) to the amplifier and monitor speaker to provide the internal alarm. The external alarm is initiated by saturating ferrodo through TO relay contacts. Option Z is used in No. 1 ESS, 4-wire systems. The TO relay will remain operated until released by operation of the DT relay or operation of the RST key.

2.06 When option Y is provided, this circuit has the capability of being reset from a remote location by the operation and release of a signal distributor applique point via the RST leads. In addition, option Y provides the ability to disable the alarm by releasing the TO relay via the ALM leads.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 The output from terminal 11 of the TO relay shall be connected to scanner D-type ferrod sensors with 100 ohms maximum external circuit resistance.

2. FUNCTIONAL DESIGNATIONS

2.01 Circuit Packs

Designation	Meaning
DTD	Dial Tone Detector
DTAT	Dial Tone Alarm Timer
DTMRD	Dial Tone Monitor and Relay Driver

2.02 Keys

Designation	Meaning
PWR OFF	Power Off
TST	Test
RST	Reset

2.03 Potentiometer

Designation	Meaning
VOL	Volume
TIME	Time

2.04 Relays

Designation	Meaning
DT	Dial Tone Detector
OR	Origination
TO	Time-Out

3. FUNCTIONS

3.01 Tests for the presence of dial tone by simulating an off-hook call origination to the central office.

3.02 Presents a 900-ohm plus 2.15 UF termination to the line being tested.

3.03 Responds to valid dial tone signals whose duration is greater than 2 seconds.

3.04 Responds to dial tone signals whose amplitude is -10 dBm ±3 dB across 900 ohms.

3.05 Is able to differentiate between valid dial tone signals and noise without responding to special out-of-band signals.

3.06 Provides protection against false operation due to noise by providing a fast recycling timer which forces a valid-looking signal to persist uninterrupted for a required time interval before the DT relay is operated.

3.07 Provides accurate origination timing intervals that are adjustable between the limits of 20 through 60 seconds.

3.08 Provides an accurate time-out timing interval of 9 ± 1 seconds.

3.09 Provides an internal alarm which consists of the output of a square-wave generator amplified and fed at a high level to a monitor speaker.

3.10 Provides external alarm terminals which supply the correct electrical conditions to saturate ferrods.

3.11 Provides a dial tone monitor consisting of a level adjustable audio amplifier coupled to a loudspeaker.

3.12 Provides a locking pushbutton switch which will open the test line so that the system will not detect the off-hook condition. This feature is used to test the sequencing of the DTDA.

3.13 Provides a momentary pushbutton which will retire the alarm circuit. Retirement of the internal alarm will cause the test sequence to be recycled.

3.14 Operates solely from standard +24 volt central office battery supplies. Before working on the circuit or removing circuit packs, the associated power removal switch must be operated to disconnect battery.

3.15 Provides the means by which the system can inhibit and/or reset the alarm circuitry.

3.16 Provides a loop closure to the master control center (MCC) when the TO relay operates.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon is to be followed.

(a) Line Switching Circuit - SD-1A106-01.

(b) Master Control Center Circuit - SD-1A122-02.

(c) Miscellaneous Circuit for All Frames - SD-1A129-01.

(d) Master Scanner Applique Circuit - SD1A133-01.

(e) Line Switching Circuit - SD-1A134-01.

(f) Universal Coupling Circuit - SD-2A014-01.

TABLE A

PARAMETERS

DESIGNATION	FOR FERRODS ALARM-ON	ALARM-OFF
NPI - Nontrunk Program Index	39	32
UTY - Unit Type	44	45
MEMN - Member Number	Assigned by Operating Company	

(g) Master Scanner Applique Circuit - SD-2A028-01.

(h) Office Status Display Circuit - SD-2A055-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 The manufacturing testing requirements are specified in the X-77996 specification.

6. ALARM INFORMATION

6.01 The alarm internal to the DTDA consists of the output of a multivibrator amplified and fed at a high level to a monitor speaker.

6.02 The external alarm terminals provide the electrical conditions to saturate ferrods. These terminals can be connected to two master scanner applique points assigned by the operating company. One ferrod is used to detect the alarm-on condition while the other ferrod detects the alarm-off condition. If the external alarm is connected in this manner, any failure detected by the DTDA circuit will produce a major alarm and the maintenance teletypewriter message:

**ARC1 MISC ALM MJ SPL XX

6.03 In this message, XX equals the member number assigned by the operating company to the alarm-on ferrod (failure condition).

6.04 Retirement of the internal alarm either automatically (by restoration of dial tone) or manually will result in the teletypewriter output message:

** ARC1 MISC ALM MN SPL XX

6.05 In this message, XX equals the member number assigned by the operating company to the alarm-off ferrod (alarm retired conditions).

6.06 The external alarm feature provides dial tone protection for unattended offices. The messages are printed on the remote maintenance teletypewriter and the remote alarm is sounded when alarms are transferred.

6.07 The teletypewriter message RC-MSNCPDN-, described in 10.01 of BSP 231-118-30, is used by the operating company to assign the appropriate scan points to the DTDA circuit.

8.06 The parameters required for the RC-MSNCPDN- message which assigns ferrods can be found in Table A.

6.09 This office alarm feature can be activated or deactivated by the appropriate recent change teletypewriter message (see 10 of BSP 231-118-30).

6.10 The major alarm sounded by the external alarm circuit can be retired at the master control center. The internal alarm which also is activated may be retired at the DTDA circuit by operating the RST key momentarily or retired remotely by the system controlled signal distributor applique circuit. Retirement of the internal alarm will cause the test sequence to be recycled by the DTDA circuit.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Option X was added to the circuit to provide the means for autonomously supplying a dial tone delay alarm signal directly to the switching control circuit (SCC).